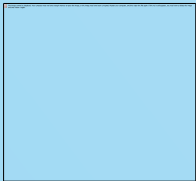


Smart Charging, interoperability standards:

....and what it means...



June 23, 2014
IEPR Workshop - Vehicle-Grid Integration
California Energy Commission

Agenda

- 1** **What is California's 'VGI' vision?**

- 2** What is a Smart Charging standard?

- 3** What can the CEC do to support acceleration toward our vision?

Our Vision: A future where

- > any PEV owner can safely plug in (Level 2) anytime and anywhere and be dispatchable as a certified resource
- > that can assist system operators in achieving our State RPS and GHG reduction goals while maintaining reliable service
- > seamlessly without confusing the consumer
- > or impacting their transportation needs
- > in a way that lowers their total cost of ownership.

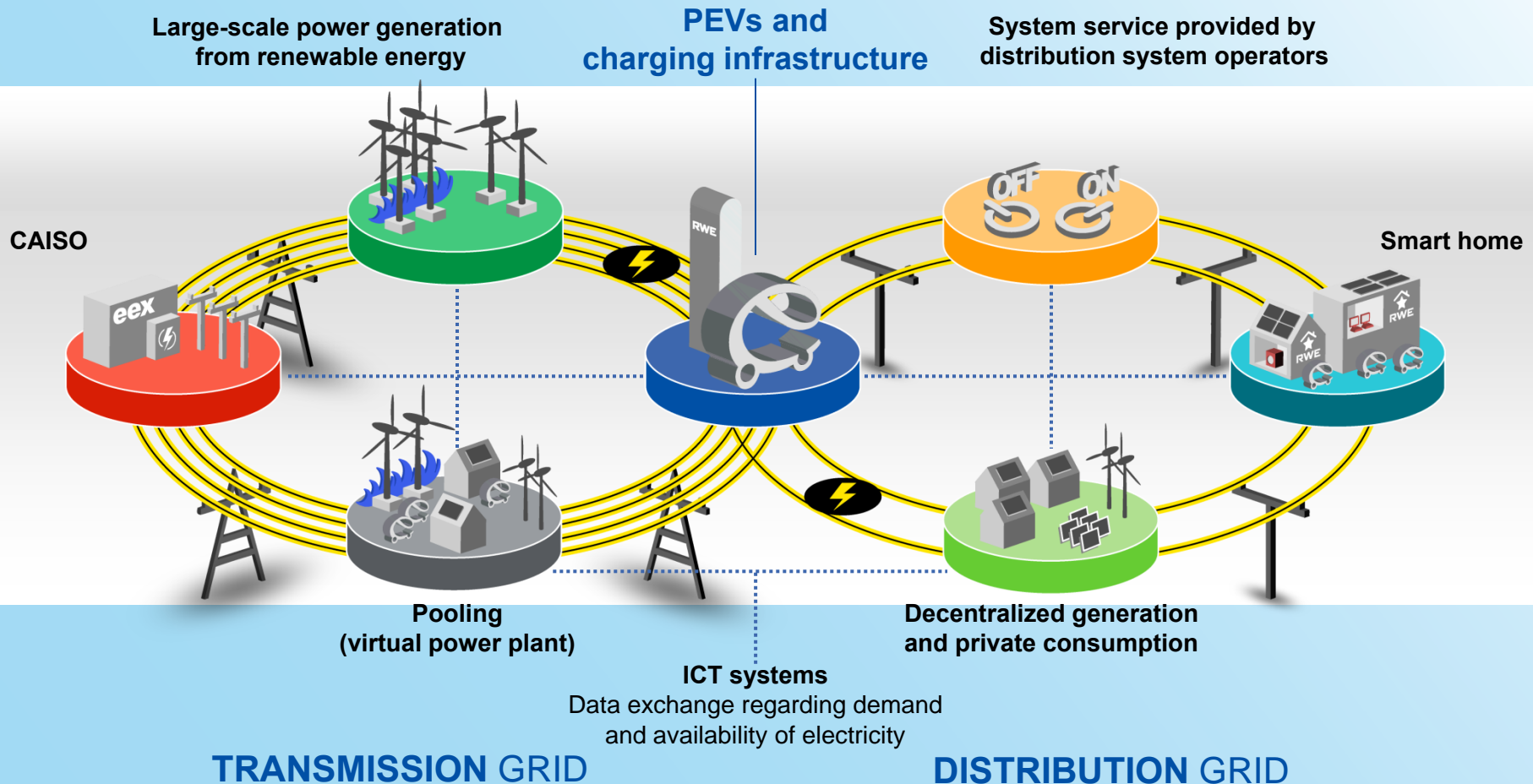


“When’s the best time to plant a tree?”

T. Boone Pickens

FOR THIS TO HAPPEN QUICKLY, WE NEED TO PLANT THE SEEDS NOW

(1) - AC Level 2



Agenda

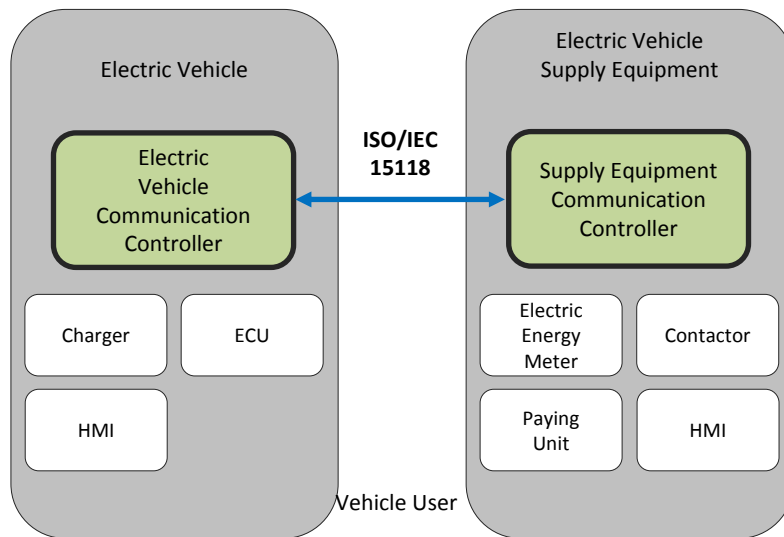
1 What is our vision?

2 **What is a Smart Charging standard?**

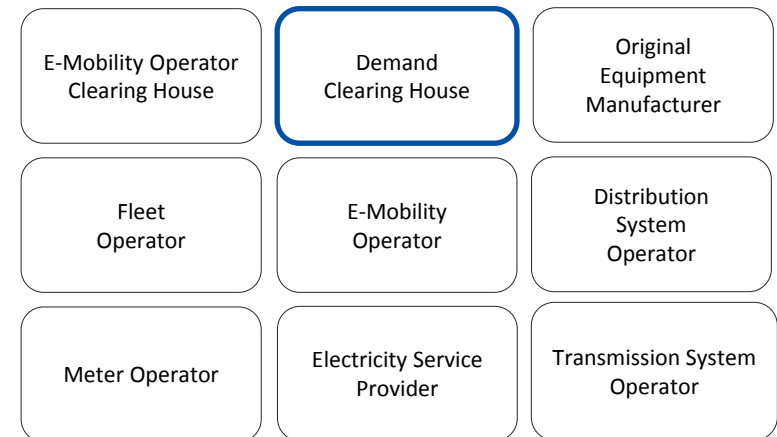
3 What can the CEC do to support acceleration?

ISO/IEC 15118

Primary Actors

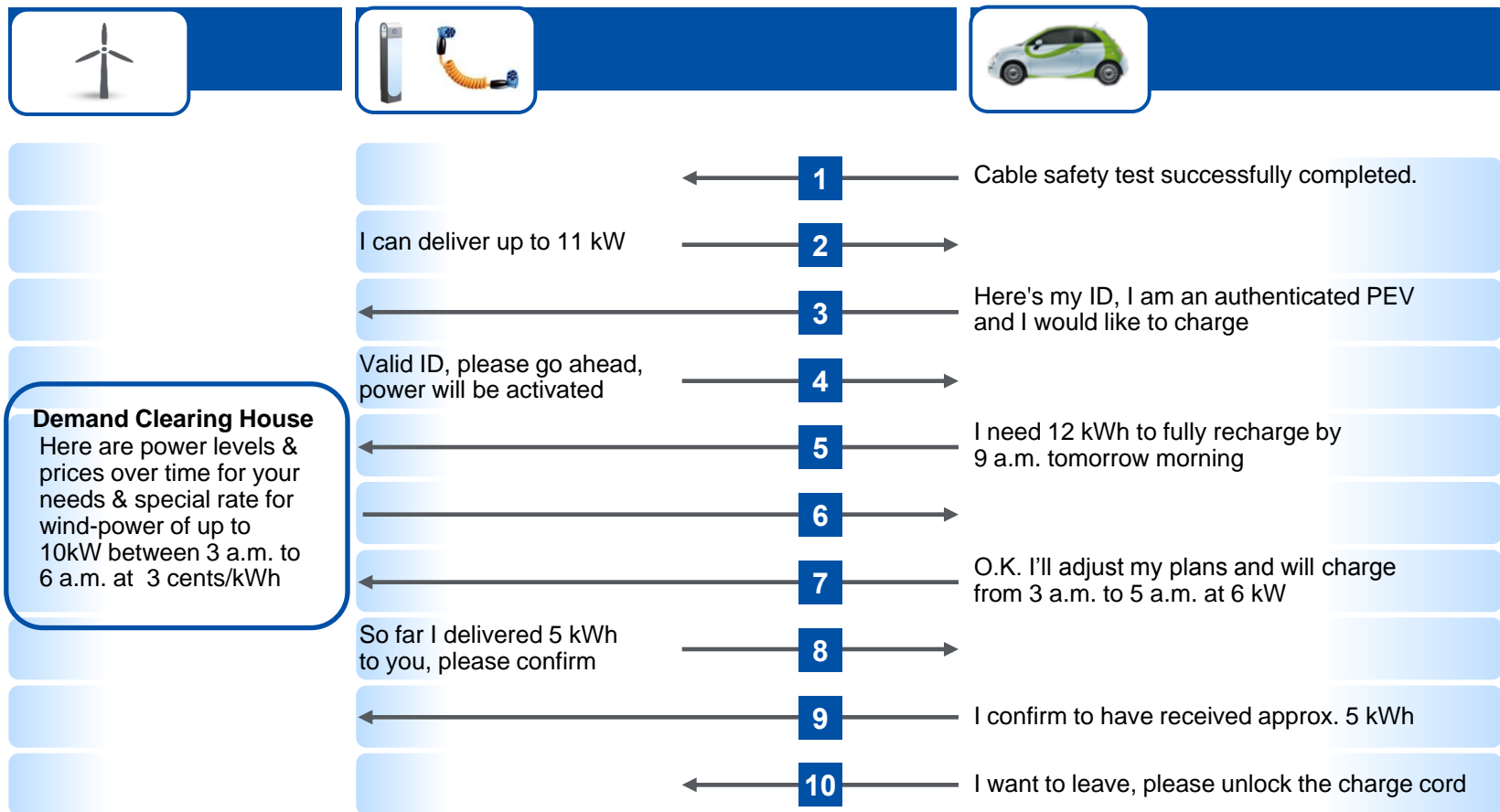


Secondary Actors



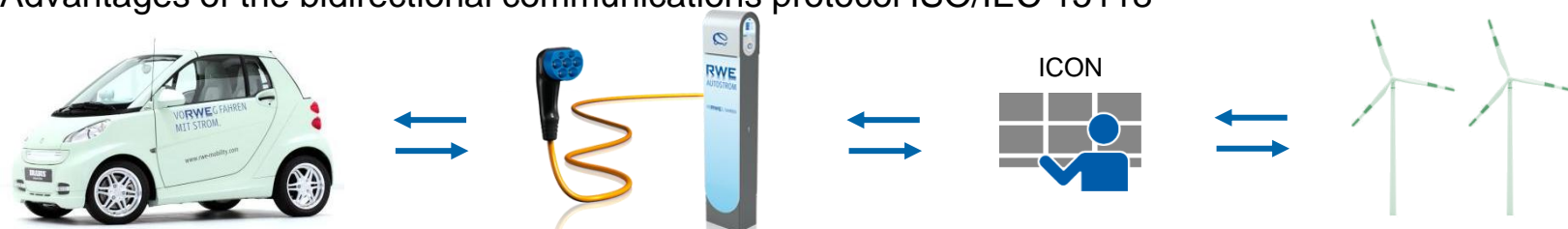
Intelligent infrastructure – through standards Smarter...Faster...Simpler...for the consumer

EXAMPLE JOINT DEVELOPMENT OF DAIMLER AND RWE ISO / IEC 15118



Smart cars (that you can buy today) connecting to smart chargers run by a smart grid: leads us where we want to go.

Advantages of the bidirectional communications protocol ISO/IEC 15118



Simplicity

- > Automated and seamless consumer experience
- > Lower Total Cost of Ownership
- > “Killer App” Transformation
- > Any car, any charging station - plug and play. BMW, Mercedes, VW and more on the way.

Grid-friendliness

- > Collection of **complete** grid picture through standards
- > Dispatch-ability as certified resource

“Demand Clearing House”

- > System Operator has situation awareness
- > Aggregation and resource certification
- > Control room confidence over time



Agenda

1 What is our vision?

2 What is a Smart Charging standard?

3 **What can the CEC do to support acceleration?**

Provide the market with a signal. Declare the standard that California will support with investments within the next 12 months.

PLANT THE TREE TO ENABLE GROWTH NOW

Base communication	<ul style="list-style-type: none"> > Identification of users & <u>Load Association</u> > Automated billing > Pathway for E-Roaming 	
Local integration/ smart home	<ul style="list-style-type: none"> > Integration in users' local energy management system > Dynamic price-responsive charging 	
Load mgmt./ smart charging	<ul style="list-style-type: none"> > Connection/integration with distribution grid > Remote or automatic load management 	
Integrations of renewables	<ul style="list-style-type: none"> > Bidirectional integration within grid > Charging/re-feeding answering supply and demand 	

Deployment of smart grid along side with E-Mobility

DSO: Distribution System Operator

V2G: Vehicle-to-grid

→ energy flow

·····→ control flow

Demand Energy Management “DEM” solution

Energy Management Dashboard

Charge sites

RWE Flamingoweg, Dortmund

RWE Flamingoweg, Dortmund

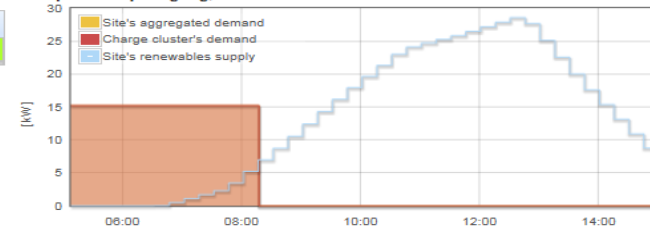
RWE Flamingoweg, Dortmund

Load Overview

Parkplatz Hauptein

Refresh

Parkplatz Haupteingang, Renewables



Charge points and sessions

Charge Point	Status	Contract ID	Planned end
BA-8978-3	SESSION_WITHO	DE-AA-000001-5	15.08.2013 08:00
BA-8990-9	FREE		
BA-8389-3	FREE		
BA-8397-9	FREE		

BA-8978-3, SESSION_WITHOUT_CHARGING

Session started 14.08.2013 11:50 **Charge type** Optimized
Planned end 15.08.2013 08:00 **Charge phases** 3
EV Battery capacity 22kWh **Max. current** 22A
Initial state of charge 20% **Min. current** 7A

[Activate](#) [Terminate](#) [Change parameters](#)



Functionalities for Use Cases

- > Static load management can be done by definition of static supply / load curves for clusters of chargers
- > Dynamic load management possible by interface to external source, e.g. for predictive solar production
- > Enables demand-charge management

Thank you!

